# A Parent-Delivered Intervention to Teach Purchasing Skills to Young Adults with Disabilities

**Caroline DiPipi-Hoy** and **Asha Jitendra,** *Lehigh University*

The present study investigated the effects of training parents of young adults with disabilities to use constant time delay to teach their children purchasing skills in the community. The parent intervention involved target skill selection and instructional planning (e.g., identifying prompts and reinforcers), parent training on constant time delay, and child training in the community using feedback. The student intervention included a parent-delivered constant time delay procedure. A multiple-probe design across three parent–child dyads was used to measure the effects of the intervention on the parent's ability to teach his or her child with disabilities and on the child's acquisition of purchasing skills in the community. Findings indicated that parents were able to apply the constant time delay procedure and that students successfully acquired the purchasing skill when taught by their parents. In addition, both parents and students maintained the effects of the instructional procedure and skill several weeks (i.e., 6–8) after the intervention was terminated. Implications for future research and practice regarding the parent-delivered time delay intervention are discussed.

The importance of parental involvement in the education of children with disabilities has been well documented in the research literature (Hilton & Henderson, 1993; Huynen, Lutzker, Bigelow, Touchette, & Campbell, 1996; Moran & Whitman, 1991; Shriver, Kramer, & Garnett, 1993). In addition, one of the provisions of the 1997 amendments to the Individuals with Disabilities Education Act emphasizes family involvement in children's special education (Huefner, 2000). As such, it is essential that school personnel consider family involvement when planning instruction to improve educational results for students with disabilities. Parents have successfully engaged in various nontraditional roles, such as advocate, teacher, program evaluator, case manager, and educational decision-maker (Allen & Hudd, 1987). In addition, findings from a recent survey of parents of children with moderate and severe disabilities indicated that some parents would like to be involved in their child's educational program, beyond simply attending parent–teacher meetings (Westling, 1996). This strong level of parental involvement in their children's lives makes it viable to support parents in home activities that would allow them to teach their children important life skills and reduce problem behaviors (Allen & Hudd, 1987). Furthermore, parents have reported a decrease in feelings of depression and improved coping skills following participation in parent training (Baker, Landen, & Kashima, 1991).

A growing research base exists that has examined the effects of teaching family members of children with disabilities (Hilton & Henderson, 1993). Several studies have involved teaching parents of preschool children how to facilitate language skills and communication (Hancock, Kaiser, & Delaney, 2002; Kaiser, Hancock, & Nietfeld, 2000). Other research has focused on teaching parents to use behavioral techniques to better cope with the problem behaviors of a child with a disability (Baker et al., 1991). For example, Huynen et al. (1996) taught four mothers of children with disabilities (e.g., autism, Down syndrome, attention-deficit disorder) to structure routines and plan activities to reduce or prevent problem behaviors. Activities included the child setting the table before dinner or engaging in various forms of play. Results indicated that planned activities training was effective for three of the four mothers in increasing appropriate parent behaviors in response to their child's challenging behaviors. In addition, an increase in appropriate child behaviors was documented in both trained and generalized settings. At the same time, positive interactions between mother and child were maintained 6 months after training.

Although research has shown that parents are able to teach their children specific skills (Baker & Brightman, 1984; Wall & Gast, 1997a), parent training programs have focused on improving child behaviors (e.g., reducing tantrums, increasing on-task behavior) and, in some instances, parent behaviors (e.g., providing reinforcement; Huynen et al., 1996). One of the few studies that involved teaching parents to use systematic instruction was conducted by Wall and Gast (1997a). In a multiple-probe-across-participants design, four parents were taught to use constant time delay to teach leisure skills to their adolescent children with disabilities. Findings indicated that all four caregivers learned the constant time delay

*Address: Caroline DiPipi-Hoy, 1010 N. New St., Bethlehem, PA 18018*

procedure within 16 sessions, on average, and that their performance increased from 0% during the probe phase to a mean of 93% after intervention. This study, however, did not examine the effects of the parent-delivered intervention on the skill performance of individuals with disabilities. A follow-up study using a multiple-baseline-across-participants design addressed this limitation (Wall & Gast, 1997b). The researchers found that students who were taught by the trained caregivers in the previous study were able to acquire newly taught home-based leisure skills (e.g., playing board games or throwing a Frisbee). Findings indicated that all four adolescents' skill performance improved from baseline (range 0%–30%) to intervention (range 90%–100%). However, the instruction in these studies was limited to the home environment and did not include the community setting.

Community-based instruction is important to enhancing the social inclusion of individuals with disabilities (Butterworth, Whitney-Thomas, & Shaw, 1997). Given that individuals with disabilities often experience social isolation in their communities as adults, community-based instruction has the potential to provide increased opportunities for interacting with peers without disabilities (Smalley, Certo, & Goetz, 1997). Typically, opportunities to practice critical community skills occur in natural family routines such as grocery shopping, eating out, or banking. Therefore, it is important that parents and caregivers of individuals with disabilities help facilitate community activities (Ferguson & Baumgart, 1991).

Although community-based instruction is important to promote independence for adolescents and young adults with disabilities, results of a recent survey regarding parents' perceptions of their child with disabilities are discouraging (Kraemer, Blacher, & Marshal, 1997). An interview of 151 parents of adolescents with severe disabilities revealed that although parents placed a high priority on preparation for future independence, they had low expectations for their son or daughter with regard to maintaining a job or living outside of the home without the necessary supports. As such, parental involvement in future planning and instruction may alleviate these concerns. In sum, it is critical that professionals facilitate transition from school to adult life for students with disabilities by using strategies to increase family involvement in the child's educational program (Kraemer et al., 1997).

The study by Sowers and Powers (1995) is one of the few community-based parent intervention studies that has used a multiple-baseline-across-participants design to examine the effectiveness of a multielement treatment on increasing the independence of three adolescents with severe physical and multiple disabilities. One aspect of this multielement treatment involved teaching two parents and one group-home caretaker to facilitate students' independence in community settings. Parent training required the application of six general rules:

1. Review the target skill prior to leaving the house.
2. Refrain from jumping in to help too quickly.
3. Do not complete the entire step when providing assistance.
4. Allow for self-correction of errors prior to intervening.
5. Direct a store clerk's attention to the student when the clerk attempts to communicate with the parent.
6. Discuss the routine, provide praise for appropriate behaviors, and address areas that need improvement with the student on the way home.

Results revealed an increase in student independence in fast food restaurants from 10% correct responding in baseline to 100% correct responding in intervention.

Another study by Alvey and Aeschleman (1990) also involved parents teaching age-appropriate restaurant skills to their sons or daughters with mental retardation. A multiple-probe-across-participants experimental design was used to examine the effectiveness of the intervention. Parents of three 7- to 9-year-old students were given an advice manual and a training session in the home. The training was designed to teach parents to facilitate greater community independence for their child by using prompting and reinforcement strategies. Training emphasized teaching 10 age-appropriate restaurant behaviors (e.g., walking to counter, ordering, getting a napkin and straw, carrying tray). After the training, parents were observed in various fast-food restaurants (e.g., McDonald's, Wendy's). Results indicated an increase in students' independent responding in restaurants from 50% before intervention to 90% after intervention. Findings of these two studies lend support to parents' ability to successfully provide community-based instruction.

Although individuals with disabilities may learn to actively participate in community activities when taught by a teacher, they may be passive when completing the same skill with a parent. Such problems of generalization by individuals with disabilities have been frequently reported in the literature (Berg, Wacher, Ebbers, & Wiggins, 1995; Haring, Breen, Weiner, & Kennedy, 1995; Steere, Straugh, Powell, & Butterworth, 1995). Further, these individuals may not maintain the skills taught because of limited opportunities to practice them outside of school (Wall & Gast, 1997b). Acquiring and maintaining community-based skills in later years becomes critical for adolescents with disabilities.

Systematic instruction is known to be effective in teaching individuals with disabilities a variety of skills within community and domestic environments (O'Reilly, Renzaglia, & Lee, 1994; Steere & Cavanagh, 1997; Test & Wood, 1997; Wall & Gast, 1997a). A body of research exists that demonstrates the viability of systematic instruction in teaching domestic skills (Williams & Cuvo, 1986), vocational skills (Steere & Cavanagh, 1997; Test & Wood, 1997), personal care skills (O'Reilly et al., 1994), and leisure skills (Wall & Gast, 1997b).

It involves errorless learning and consists of chaining and shaping procedures, a system of prompts, reinforcement and feedback, and fading (Test & Wood, 1997). Systematic instruction procedures commonly used with individuals with disabilities are antecedent prompt and test, antecedent prompt and fade, most-to-least-intrusive prompting, and the system of least prompts (for a review, see Ault, Wolery, Doyle, & Gast, 1989). Additionally, constant time delay and progressive time delay procedures have effectively been used to teach chained tasks to individuals with disabilities. In particular, Fiscus, Schuster, Morse, and Collins (2000) used constant time delay to teach food preparation skills to students with moderate to severe disabilities. In this study, four elementary students were taught to make cheese and crackers, waffles with syrup, and chocolate milk. A multiple-probe design across behaviors was used to examine each student's acquisition of the various skills. Results indicated that three of the four participants acquired the three food preparation skills and reached criterion (100% accuracy on all steps of the task analysis for three sessions) within an average of 30 to 51 sessions. Further, three of the four students acquired additional incidental information (e.g., sentence and word reading from recipe cards). Overall, this study demonstrates the effectiveness of systematic instruction. If parents and support staff members are to maximize the effectiveness of instruction for individuals with disabilities, it is important that they are trained in systematic instruction procedures. This means carefully attending to the details and precise sequence of instruction to effectively teach important life skills (Parsons, Reid, & Green, 1996).

The purpose of the current study was to extend existing research on training parents to use a constant time delay procedure to increase skill acquisition for their adolescent children with disabilities. The time delay procedure included a four-step instructional sequence that parents could easily implement in a community setting. Specifically, this study assessed the effects of a training package on parent behaviors during community-based activities with their children with disabilities. The current study differs from previous studies by involving parent participants in planning sessions to identify relevant skills for instruction and to develop an instructional plan (e.g., selection of prompts and reinforcers). For example, parents selected how to best prompt their child to respond and identified ways to reinforce correct responses. At the same time, the study addressed family needs (e.g., schedule). The current investigation addressed the following three research questions:

1. Will parents successfully acquire and apply a constant time delay procedure in teaching their daughter a community skill, as measured by the percentage of correct instructional steps on a competency checklist?
2. To what extent will students acquire the community skill when taught by their parents, as measured by unprompted correct responses on the task analysis?
3. Will parents and students maintain the learned strategy and/or skill following the termination of the intervention, as measured by the percentage of correct instructional steps on a competency checklist and unprompted correct responses on a task analysis?

# Method

## *Participants*

Parents of adolescents with disabilities who were enrolled in a university vocational transition program were recruited to participate in the study. These parents were selected because of their children's demonstrated need for additional instruction in functional community skills. Three parent–child dyads volunteered to participate in the study. Dyads consisted of a female adolescent or young adult with a disability and her mother. Participants were Vivian, Maggie, Bonny, and their mothers. To be included in the study, each parent participant had to express an interest in (a) learning the intervention, (b) directly teaching her child community skills, and (c) working as part of a team to plan and implement the intervention.

Vivian's mother was a 48-year-old homemaker with a high school education. She maintained an active relationship with Vivian's teachers and consistently expressed interest in her daughter's education. She served as a parent volunteer in the classroom and attended field trips to assist Vivian's teacher. She lived with her husband; Vivian was their only child.

Maggie's mother was a 45-year-old single parent of one child. She had a college education and worked as a record keeper at a local hospital. Maggie's mother expressed a desire for her daughter to experience positive postschool outcomes. However, she indicated that she was not actively involved with Maggie's education due to working full-time and maintaining her home. As such, her involvement with Maggie's teacher was limited to attendance at Individualized Education Program (IEP) meetings.

Bonny's mother was a 47-year-old with a college education and graduate degree. She worked as a speech therapist at a local school. She lived with her husband and two children. Bonny's mother's involvement in her daughter's education was also limited due to a full-time job. However, she expressed serious concerns about her daughter's future and collaborated with the transition program in securing employment for her daughter. Prior to this study, none of the parent participants had received formal training in the constant time delay procedure.

Student participant selection was based on several criteria. First, parent interviews indicated that their child evidenced significant difficulties using money, a skill necessary for in-

dependent functioning. Second, student participants had to reside at home with their family. Third, they had to be secondary school students between the ages of 14 and 21 who would transition from school to adult life in a few years. The three participants were enrolled in school districts located in northeastern Pennsylvania. At the time of the study, all three participants were preparing to exit high school within 2 years or less. They participated in a vocational transition program for half of their school day (e.g., 3 hours). This involved employment at a community job site supported by an instructor. Each student was taught specific vocational skills using the system of least-to-most prompts. Vivian worked at a florist shop and learned to trim leaves, make bows, and clean the store. Maggie worked at a day care facility, where she interacted with the children as their teacher. Bonny worked in the laundry room of a nursing home, folding towels. All three students shared similar goals of working and living in the community upon graduation. These students were able to follow three- to five-step verbal instructions. It must be noted that although the three students received purchasing instruction in school, it involved simulated money skill instruction (e.g., recognizing bills and coins) only. All three mothers reported that their daughters experienced difficulty generalizing the skill to purchasing situations in the community.

Vivian, a 16-year-old girl with cerebral palsy, learning disabilities, and a history of a seizure disorder, received instruction in a learning support classroom. Vivian's Full Scale IQ on the *Wechsler Intelligence Scale for Children–Revised* (WISC-R; Wechsler, 1974) was 78. She scored at the first-grade reading level (e.g., 1.3) on the *Kaufman Test of Educational Assessment* (KTEA; Kaufman & Kaufman, 1982). Although Vivian was not diagnosed as having mental retardation, her teachers and transition program staff members indicated that she exhibited significant difficulties with functional academic skills, such as purchasing and self-direction. Therefore, involvement in the current intervention study was deemed to be appropriate for Vivian.

Maggie was a 20-year-old with a diagnosis of moderate mental retardation who was attending her last year of school. Maggie was enrolled in a high school self-contained, life skills special education classroom for students with mental retardation. Maggie's Full Scale IQ score on the WISC III was 55. At the time of the study, she was working on Level 1 of the Edmark Reading Program and was able to read 25 functional words. Adaptive behavior scores were not available for Maggie. However, her teacher reported that Maggie experienced functional academic skill deficits with respect to following directions, interacting with others in the community, and using money.

Bonny, a 16-year-old girl with Down syndrome and moderate mental retardation, received instruction in a learning support classroom. Her Full Scale IQ was 49, as measured by the WISC III. Bonny scored at the third-grade reading level (e.g., 3.5) on the KTEA. Adaptive behavior scores were not available for Bonny. However, her teacher indicated that she had few functional community skills within her repertoire. In particular, Bonny experienced difficulty reading sight words and using money.

## *Setting*

All assessment occurred in a variety of community sites (e.g., grocery stores, music stores, pet stores, department stores, discount stores). Initial parent training occurred in each parent's home, whereas child training using constant time delay to teach the target skill occurred in community settings. Intervention sites included ones used during the probe phase, as well as some additional sites for Dyad 3 only (see Table 1). The community sites differed across each dyad based on the individual needs of the family. For example, Dyad 1 shopped at discount stores located in close proximity to their neighborhood to purchase home necessities. They also shopped at a supermarket (i.e., Wal-Mart) to purchase food items or at Ames Department Store to purchase dog bones. Several times, they went to a small dollar store called Phil's Discount Store. In contrast, Dyad 2 went to the same grocery store (e.g., Laneco) during each observation and purchased food items for dinner. Dyad 3 shopped at a variety of small stores. In addition, they shopped at small specialty stores located about 20 miles away from their home. For example, they shopped at a small pet store to purchase supplies for the family pet and a music store to purchase reeds for the daughter's saxophone.

## *Dependent Measures and Response Measurement*

The primary dependent measure was the percentage of correct instructional steps on a competency checklist, which was used to assess parents' acquisition of the constant time delay procedure in both training and community settings. The competency checklist included an instructional sequence of task direction, a verbal prompt, a 2-second delay, and feedback (Wolery, Ault, & Doyle, 1992). The checklist also included task steps that were derived from a task analysis of the target

**TABLE 1.** Probe and Intervention Community Sites

| Participants | Probe | Intervention |
|---|---|---|
| Dyad 1 | Wal-Mart<br>Phil's Discount Store | Ames Department Store<br>Phil's Discount Store<br>Wal-Mart |
| Dyad 2 | Laneco Grocery Store | Laneco Grocery Store |
| Dyad 3 | The Pet Stop<br>Paynter's Music Store | The Pet Stop<br>Paynter's Music Store |

skill. The task analysis identified the steps needed to make a successful store purchase and were listed along the vertical axis of the checklist. The checklist was used to record the percentage of correctly implemented constant time delay instructional steps for each task step. For all phases of the study (probe, intervention, maintenance), a plus sign was recorded for each item on the constant time delay checklist that the parent correctly implemented. A minus sign was used to record incorrect steps. That is, whenever the parent correctly implemented an instructional step, it was recorded for each of the task steps (e.g., locate item, bring item to register, wait in line, get wallet, give items to cashier, count out bills, collect change, put money in wallet, get bag, leave store). For example, during the task analysis step that required the student to get her wallet, if the parent praised the student for getting her wallet independently, the parent checklist was marked with a plus sign in the feedback column for the "get the wallet" step. On the other hand, if the parent did not praise the student, a minus was marked for the same step.

When the child completed a step independently and a parent response was not required, it was recorded as NA, to indicate that the step was not applicable. As such, these steps were not factored into the calculation of percentage of correct responses. With the exception of the task direction, the remaining three parent behaviors (i.e., verbal prompt, 2-second delay, and feedback) were observed for each task step of the target skill. The task direction (e.g., "Now you shop") was provided only once prior to beginning the purchasing routine. The percentage of correct parent behaviors was calculated by dividing the number of correct steps by the number of correct and incorrect steps and multiplying by 100.

Another dependent measure was the percentage of unprompted correct responses or correct anticipations on the task skill steps completed by the student, which was also recorded on the competency checklist next to the parent instructional steps. This measure assessed the student's acquisition of the target skill. The first item gathered in the store was scored for Steps 1 and 2 (i.e., locate item, bring item to register) of the task analysis. As such, although multiple items may have been purchased, only the first item gathered was scored. For all phases of the study, responses completed correctly were recorded with a plus sign. Responses were scored as correct when the participant correctly completed a task step before the prompt (correct anticipation). All self-corrections before the prompt were scored as correct responses. A minus sign was used to record incorrect responses. Responses were scored as incorrect when the participant completed the task step incorrectly prior to the verbal prompt (nonwait error) or after the prompt (wait error) or did not respond (no-response error) within 2 seconds. Only independent (unprompted by parents) correct responses were counted toward criterion (i.e., 2 days of 100% correct responding). Natural environmental cues (e.g., the cashier stating the purchase amount) served as the discriminative stimulus for the next step of the task (e.g., getting the money out). The percentage of unprompted responses was calculated by dividing the number of correct responses by the number of correct and incorrect responses and multiplying by 100.

## *Social Validity*

Each member of the parent–child dyad completed a satisfaction questionnaire at the end of the intervention. The questionnaire consisted of a 5-point Likert scale, ranging from 1 (*strongly agree*) to 5 (*strongly disagree*), and was used to assess participants' perceptions regarding the intervention. The parent questionnaire solicited responses regarding the overall effectiveness of the intervention, the ease of implementation, the intervention's impact on the parent–child relationship, the time involved in the intervention, and whether or not they would continue to use the intervention or recommend it to others. Additionally, two open-ended questions asked parents to comment on intervention aspects that they found helpful, as well as components that could be improved upon. The student questionnaire had students respond to items regarding whether they thought they actually learned a new skill, became more independent as a result of learning the new skill, and enjoyed learning from their mother, and if they would recommend the skill instruction to other families. Students also were asked to respond to two open-ended questions regarding helpful aspects of the strategy, additional skills that they would like to learn with this strategy, and how it could be improved. All responses were returned in a sealed envelope to the first author.

## *Experimental Design and Overview*

A multiple-probe design across parent–child dyads was used to evaluate the effects of the intervention on parents' acquisition and implementation of a constant time delay procedure and students' purchasing skill acquisition. The design began with probes in which data were collected on the percentage of correct parent steps on the competency checklist and the percentage of unprompted responses on the task analysis for the daughters. The intervention was administered in a staggered fashion following the probe, and one parent participant was introduced to the intervention at a time. Parent training of the constant time delay procedure phase began in the parent's home with the parent in the first dyad. The next phase, child training, began for the first parent following mastery (e.g., two consecutive sessions at 100%) of time delay instructional steps in the parent training phase. The remaining participants were introduced to the intervention when the data for the preceding parent and child participants showed an accelerating trend for a minimum of three sessions, so that all participants eventually completed the intervention. When a parent and her daughter reached mastery (e.g., two consecutive sessions at 100%) in the community setting, the intervention ended and the dyad entered the maintenance phase.

## *Procedures*

**Preassessment.** After the parent's and student's consent to participate in the training had been obtained, the first author discussed the importance of preparing for adult life with each parent–student dyad. Each dyad then identified a community skill that was deemed important to target for instruction. The selection of the target skill was based on the student's input and the parent's priorities regarding current needs for support and future opportunities for her daughter to gain independence in the community. All three student participants indicated interest in independently going to stores and purchasing items. Each dyad chose a purchasing skill for the purpose of instruction in this study.

The first author then developed a generic task analysis of the purchasing skill to specify the task steps. Parents were not involved in the development of the task analysis, because it was necessary to ensure that they were not influenced by the task analysis to change their normal purchasing routine in the community. This generic task analysis was used during the probe phase to record student behaviors.

**General Procedures.** For both probe and training conditions, the number of sessions per week varied according to the schedules of each dyad but on average consisted of two sessions. Similarly, the time of day and length of the sessions during the child training phase varied depending on how many items the dyad was purchasing and how long it took them to locate each item, as well as when it was convenient for them to shop. Most sessions lasted approximately 30 minutes or less and took place in the evening or on weekends. Each dyad was instructed to prepare a written shopping list of needed items. To ensure that the purchasing routine was naturally occurring, each dyad was asked to decide on the type and number of items to purchase, based on their own personal needs. The number of items ranged from three to five across participants.

**Probe.** In this condition, probe data were collected in the community while the parent and student completed the purchasing routine. Parents were instructed to complete the entire purchasing task using the typical procedures for shopping with their daughter. No other specific instruction was provided. The first author followed the dyad and observed them in an unobtrusive manner by following them at a distance and engaging in behaviors (e.g., shopping) similar to other store customers. During this time, parent behavior data were collected on each step of the competency checklist. The parent completed the entire purchasing routine without interruption. No verbal feedback for either correct or incorrect responding was provided.

Probe data on student skill acquisition were collected using the generic task analysis. A multiple-opportunity probe, in which students were provided with the opportunity to complete all steps of the purchasing routine, was used to record correct and incorrect responses on the task analysis. For example, when the student did not complete a step or completed it incorrectly, a minus sign was recorded, and the next step was presented. This procedure was continued until all task steps were presented. Parents were instructed to complete their purchasing routine as planned and continue with each step whether or not their daughter participated. They were told that if their daughter completed a step incorrectly, they should continue shopping without providing verbal feedback.

**Constant Time Delay.** The first author served as the primary trainer for the study. The intervention included a planning phase and an instruction phase.

***Parent planning.*** Planning sessions took place during four 25-minute sessions in the parent's home. During these sessions, the trainer, the parent, and the student jointly developed an instructional plan based on the target skill identified by the parent and student. The parent and trainer also discussed logistics (e.g., scheduling, location) regarding the intervention. All three parents indicated that they preferred the training to be conducted in their home.

The trainer then discussed the constant time delay procedure, which included a rationale for using constant time delay in the community (e.g., effective, easy to use) and a description of its key components (i.e., task direction, verbal prompt, 2-second delay, and feedback). The 2-second delay was arbitrarily chosen, to provide the student with enough time to respond to the prompt but also perform the step within a time frame appropriate for the community. This four-step procedure is a modification of the six-step sequence recommended by Wolery et al. (1992). Typically, in a constant time delay procedure, initial trials are conducted at 0-second delay, with the instructor delivering the controlling prompt (Wolery et al., 1992). However, we did not use 0-second delay trials in this study, because we wanted it to be consistent with a naturalistic delay procedure (Schwartz, Anderson, & Halle, 1989). Further, given that participants in the study responded well to verbal instructions, parents indicated that providing a verbal description of the task upon entering the store and presenting a task direction ("Now you shop") before beginning the purchasing routine were important. A second modification involved the length of time between the prompt and the student's response. Wolery et al. (1992) suggested that the instructor provide the student with a set amount of time to complete the step following task initiation. In our study, the student was given 2 seconds to initiate a response. Although no time limit was set to complete the step, all students responded within 10 seconds.

During the planning phase, each dyad selected various stores (e.g., grocery stores, discount stores) in the community (see Table 1) that would be used during child training. In addition, parents selected social reinforcers (e.g., smile, verbal praise) based on their knowledge of their child. Parents were

asked to provide a detailed description of what they did when they went shopping with their daughters. From this information, it was deemed necessary to modify the original task analysis with nine steps to include an additional step. Specifically, a step requiring the student to repeat the total amount of the purchase after the cashier stated the amount was added, to ensure that the student heard the price clearly and was paying attention to the cashier. Finally, the parent identified appropriate prompts ("Get the milk") to teach each step of the skill. The planning session resulted in the parent and trainer agreeing on all details (e.g., when and where the task would be completed) and developing a systematic instructional plan.

***Parent training.*** This training occurred in the parent's home. Following a review of the key components of the constant time delay procedure, role-play and modeling were used to teach the four steps of the constant time delay instructional sequence. During modeling and role-play, the trainer simulated instruction by teaching the purchasing skill to the parent as she played the role of the student. First, the trainer verbally explained each step of the task analysis (e.g., "When you shop today, you first get the milk in the dairy section, then you take it to the cashier, wait in line, get your wallet, hand your item to the cashier, and pay for it."). The trainer then presented the general task direction to begin the purchasing routine by saying, "Now you are going to shop." Parents were taught to provide this directive once at the beginning of the session and fade it from a direct verbal to an indirect verbal statement as the student reached mastery (e.g., "What do you need to do now?").

Next, the trainer modeled the prompting procedure for each individual step in the parent's home. For example, the trainer would say, "Get the milk" and wait 2 seconds for the parent to walk to the refrigerator and get a container of milk. At the beginning of each new step, the trainer modeled how to prompt for each step of the task analysis and counted 2 seconds prior to giving feedback. When the parent responded correctly to the trainer's prompt within 2 seconds, the descriptive verbal praise was delivered (e.g., "Good job getting the milk"). If the parent responded incorrectly, the trainer provided corrective feedback by stopping the parent and modeling the correct response (e.g., "No, we get the milk here"). Next, parent/student roles were exchanged, with the parent modeling and providing the instruction and the trainer playing the role of the student. During this training, parents were encouraged to ask questions. Additionally, the trainer discussed the importance of providing the child with opportunities to respond to naturally occurring cues in the environment (e.g., the cashier stating the total purchase amount) prior to prompting so that the child would not become dependent on prompts.

After the modeling and role-play session, the parent viewed a video of a student receiving constant time delay instruction on a chained task (e.g., withdrawing money from an ATM machine). Following the video, the trainer again modeled the constant time delay procedure using examples and nonexamples. An example may include the trainer waiting 2 seconds after prompting, while a nonexample may involve providing reinforcement for an incorrect response. When the parent reached criterion responding during role-play (2 days at 100% correct) on the use of the constant time delay procedure, as measured by the competency checklist, she was deemed ready to move to the child training phase. Mastery was demonstrated within three sessions on average across the three participants. This phase ended with a discussion of using constant time delay to teach other community skills and with the parents generating a list of skills that they felt their daughters needed to learn and discussing how they could use constant time delay to teach those skills.

***Child training using constant time delay.*** After the parent training phase, parents applied the constant time delay procedure to teach their daughters a purchasing skill in the community. This instruction occurred on a schedule, set by the parent, that matched the most natural location and time for the activity to occur (e.g., going to the grocery store on Saturdays or in the evening after work). Parents contacted the trainer prior to planned shopping trips.

When they arrived at the community site, the parent verbally described the skill for the child (e.g., "When you shop today, you first get the milk in the dairy section"). The verbal task description occurred once at the beginning of the routine and was faded out when the student achieved 80% correct responses or higher. During fading, verbal explanation of the task was less descriptive (e.g., "Now you will shop"). The task description was followed by the presentation of a task direction ("Now you are going to shop"). For each step, the parent prompted with a verbal cue (e.g., "Get the milk"), waited 2 seconds for the student to respond, and then delivered feedback, including descriptive verbal praise (e.g., "Great job getting your wallet") for correct responses and verbal error correction with a model for incorrect responses (e.g., "No, you need to get your wallet, like this"). The verbal praise also was eventually faded out when the student approached mastery. Parents were instructed to provide verbal praise for every correct response and fade it out when the student began to complete the task more independently. However, it must be noted that praise was not systematically faded out, like the task description.

At the end of each session in the community, the trainer met with the parent to discuss the session and provide corrective feedback about implementing the constant time delay procedure. For example, a short booster session was used to provide additional training in a difficult area. Only one booster session was necessary for one parent participant, and it occurred in her home within 2 days after the observation. During this session, the trainer had the parent role-play to practice correct prompting.

**Maintenance.** Maintenance probes were collected on the target skill several weeks after mastery, to determine whether the learned skills maintained over time. The parents selected the locations for maintenance sessions based on their family needs. For Vivian, the first and second maintenance probes

were collected 3 and 8 weeks after the termination of intervention, respectively. For Maggie, the two maintenance probes were collected 3 and 8 weeks following the completion of the intervention. Maintenance data for Bonny were collected 3 and 6 weeks after the intervention. During the maintenance phase, the dyads were instructed to complete their shopping routine as they did during probe and intervention phases. The trainer observed the routine and collected data on parent and student skill behaviors.

**Interobserver Agreement.** Across all phases, the first author and a paraprofessional in the field of special education independently recorded participants' responses to obtain interobserver agreement data on (a) parent acquisition of target skill instruction (e.g., percentage correct on the competency checklist), and (b) student acquisition of skills (e.g., percentage correct on the task analysis). Both observers stood in the same aisle of the store and within close proximity of the dyad to be able to hear and watch the purchasing routine. The observers closely followed the dyad and engaged in purchasing behaviors to ensure that others in the store were not aware that they were collecting data on the dyad. For example, one observer walked directly behind the dyad and the other walked off to the side. The percentage of interobserver agreement for all sessions was calculated using a point-by-point agreement procedure (Kazdin, 1982) in which the total number of agreements was divided by agreements plus disagreements and multiplied by a 100. *Agreement* was defined as any item scored the same by the two observers, and *disagreement* was defined as any item scored differently by the two observers.

Interobserver checks were conducted for a minimum of 30% of all sessions during each phase. Mean observer agreement for student skill acquisition was 96%, with a range of 94% to 100% across all students and phases. The mean agreement for Vivian was 97%, with a range of 95% to 100%. For Maggie, the mean agreement was 95%, with a range of 92% to 100%. The mean agreement for Bonny was 95%, with a range of 93% to 100%. Mean observer agreement for parent strategy usage was 98%, with a range of 97% to 100% across all parents and phases. Mean agreement for Vivian's mother was 98%, with a range of 97% to 100%. Mean agreement for Maggie's mother was 96%, with a range of 93% to 100%. Mean agreement for Bonny's mother was 94%, with a range of 95% to 100%.

**Procedural Reliability.** Procedural reliability data were collected for all phases by a trained observer (i.e., the special education paraprofessional), using a procedural checklist developed directly from the methods used in the study. The observer checked the occurrence or nonoccurrence of each step on the checklist (e.g., trainer unobtrusively observed the dyad in the community; parents identified reinforcers and prompts; constant time delay procedure taught using modeling, role-play, and video), to determine the fidelity of the treatment or the consistency with which the instructor followed directions in each phase. Procedural reliability data were collected for 30% of the sessions during each phase. The mean percentage of procedural reliability across phases and participants was 90% (range of 90%–100%).

# Results

## *Acquisition and Maintenance Performance: Parent Participants*

Figure 1 presents parent performance data during probe, child training, and maintenance phases. The mean percentage for all three parent participants during the probe condition revealed a stable performance at 0% independent, correct responses. After three sessions at 0%, parent training was initiated with Vivian's mother. She reached criterion in three sessions. During the child training phase following parent training, Vivian's mother implemented the intervention and her performance increased to 100% correct responses in the fourth session. She continued to respond with 100% accuracy during subsequent sessions. The data reveal a high level of stability at 100% correct responses and a zero celerating trend. For instance, the data did not accelerate or decelerate but remained stable. Data collected 3 and 8 weeks following the end of the intervention again reveal a stable trend, as she maintained the skill at 100%.

Similarly, data for Maggie's mother indicate an increase from probe to instructional phase. Following mastery of the constant time delay procedure during parent training (i.e., three sessions), she entered the child training phase. Her performance increased from 0% during the probe condition to 93% during the first session in the intervention phase. As shown in Figure 1, although the data indicate a decrease to 87% correct in the second session, her performance increased to 100% and remained at that level for subsequent sessions during the child training phase. Three weeks and 7 weeks after the conclusion of the intervention, data indicate a slight decrease in performance from 100% during the intervention phase to 86% and 92% during maintenance.

Bonny's mother's performance also increased from a mean score of 0% correct responses in the probe condition to 100% correct immediately following the intervention and remained at that level for the remaining sessions. She continued to maintain this level of correct responses at follow-up 3 weeks and 6 weeks following the end of the intervention.

## *Acquisition and Maintenance Performance: Student Participants*

Figure 2 illustrates's students' skill acquisition and maintenance for community purchasing when taught by their mothers. During the probe phase, all three participants demonstrated low levels of unprompted correct responses. For Vivian, data during the probe condition indicate a stable pattern and a mean performance of 22% unprompted correct responses.

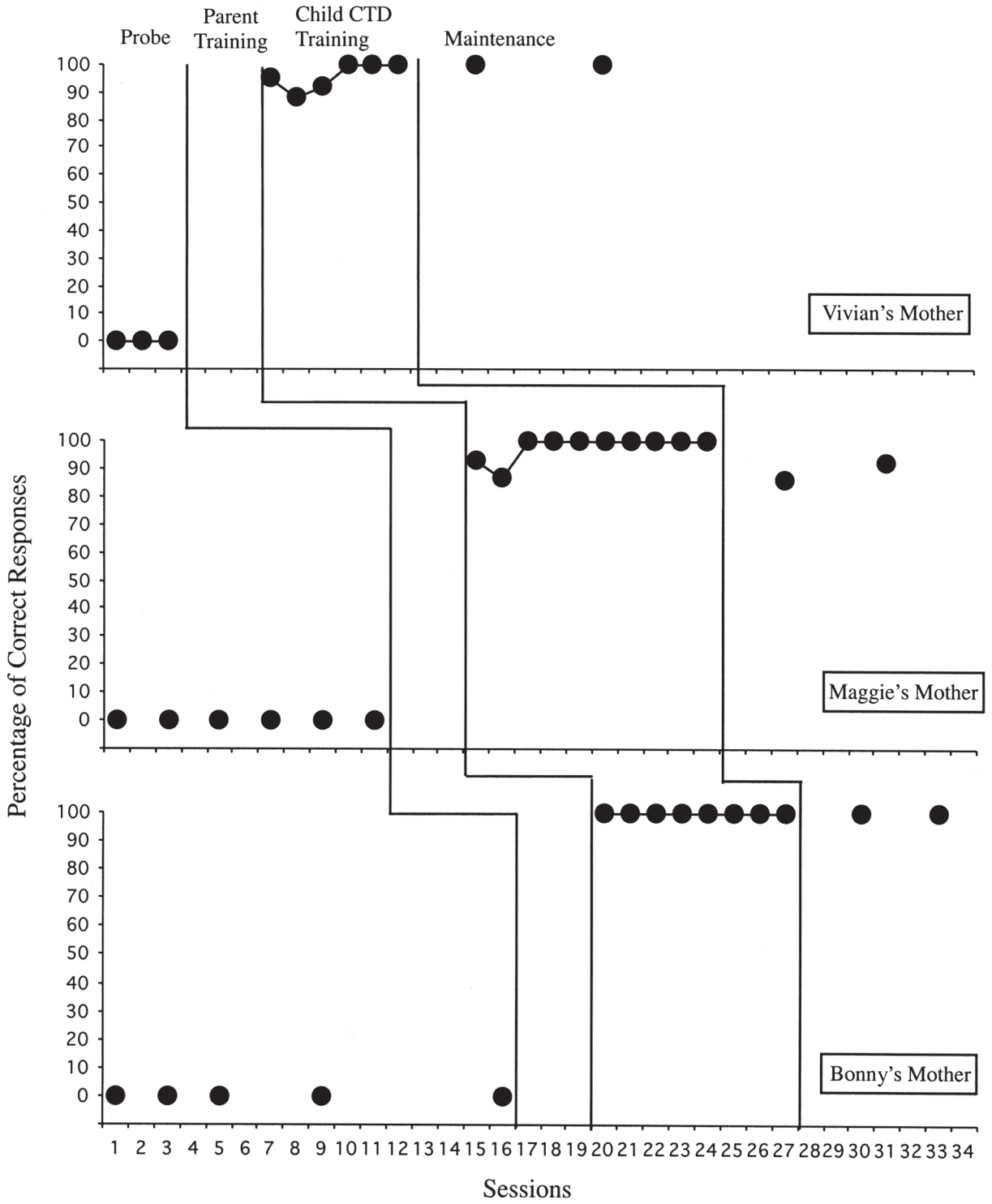


**FIGURE 1.** Percentage of correctly completed parent behaviors during probe, intervention, and maintenance conditions. *Note.* CTD = constant time delay.

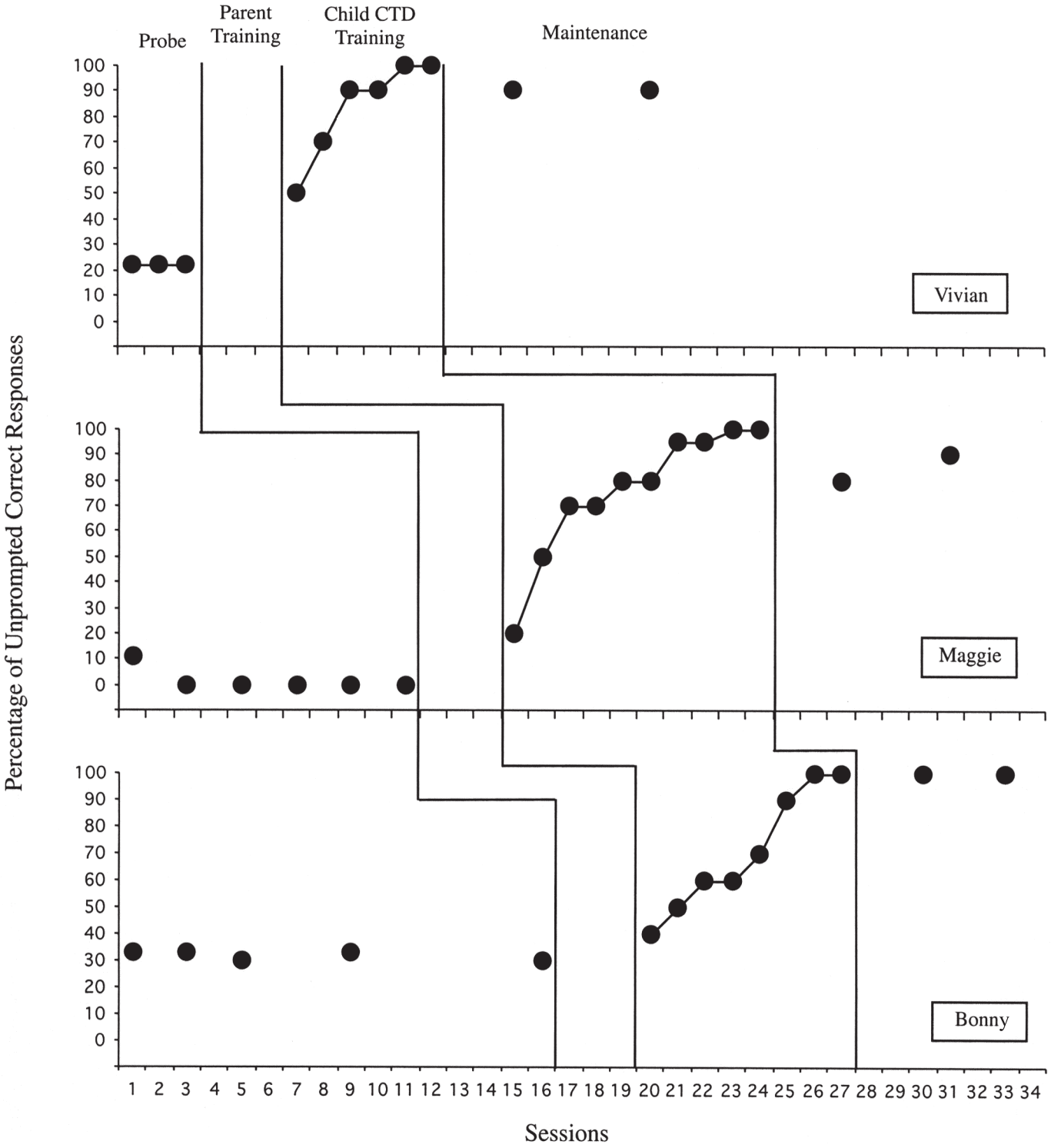


**FIGURE 2.** Percentage of unprompted correct responses (correct anticipations) by students during probe, intervention, and maintenance conditions. *Note.* CTD = constant time delay.

However, an immediate increase in scores to 50% correct was seen in the first session following the implementation of the intervention. Vivian's performance continued to show an increasing trend during child of the constant time delay procedure. She reached criterion performance of 100% in the fifth session and achieved mastery in a total of 3 weeks (i.e., 6 sessions). The mean percentage of errors to criterion was 16%. Further, follow-up at 3 and 8 weeks after instruction ended indicated that Vivian maintained the skill at 90% correct responses.

For Maggie, the data also indicate an increase in performance from the probe to the child training conditions. Her performance increased from a mean score of 3.67% during the probe condition to 20% unprompted correct responses in the first intervention session taught by her mother in the community. Then, a steady increase in performance was noted and she reached criterion of 100% mastery in 10 weeks. The mean percentage of errors to criterion was 36% for Maggie. Three weeks and 7 weeks after the intervention ended, maintenance data reveal scores of 80% and 90%, respectively.

The mean performance for Bonny during the probe phase was 32% unprompted correct responses. During the intervention phase, her data indicate an increasing trend from 40% to 100% correct responses. Bonny reached mastery in 8 weeks. Her mean percentage of errors to criterion was 10%. Three weeks and 6 weeks after the intervention ended, maintenance data for Bonny reveal a mean score of 100% correct responses.

### *Social Validity*

Social validity data for the first dyad reveal high levels of intervention satisfaction for both the parent and the student. With the exception of one item on the questionnaire (i.e., "This procedure helped me improve my relationship with my child"), which she gave a score of 4 (*somewhat agree*), Vivian's mother rated all other items with a score of 5 (*strongly agree*). She noted several components of the intervention as being especially helpful. For example, she indicated that breaking the skill into short steps, using language with specific cueing, and using the 2-second waiting time before prompting worked well. With regard to areas of improvement, Vivian's mother suggested providing her daughter with more opportunities for skill practice. The student participant gave a score of 5 for all items. She noted that the breaking the skill into parts, providing sufficient time to learn each step, and using praise were especially helpful. Areas of improvement included learning some strategies to help her avoid feelings of nervousness when purchasing.

The second dyad's data also indicated satisfaction with the intervention. Data for Maggie's mother reveal scores of 5 for all items, with the exception of four items, to which she gave scores of 4. For these items, the mother indicated that (a) the intervention helped her teach her daughter new skills, (b) her family would benefit from this intervention, (c) she enjoyed teaching her child, and (d) her daughter enjoyed being taught by her. Maggie's mother felt that the strength of this intervention was allowing her daughter to become more independent. Each item received a rating of 5 by Maggie, with the exception of Item 3 ("I enjoy learning from my mother or father"), which she gave a score of 4.

The third dyad also responded favorably to the intervention. Bonny's mother rated each item with a score of 5, with the exception of one item ("My daughter enjoys being taught by me"), which she rated as a 3. Bonny's mother noted that the most helpful aspect of the intervention was the video and role-play. Bonny rated each item with a 5 and indicated that she enjoyed using money and independently purchasing items.

## Discussion

In this investigation, findings of a training package designed to teach parents to use constant time delay indicated that parents were successful in teaching purchasing skills (i.e., money usage) to their adolescent daughters with disabilities. These findings are consistent with prior research involving parent training (Baker et al., 1991; Huynen et al., 1996; Wall & Gast, 1997a). In contrast to previous studies in which researchers designed the parent interventions (e.g., Baker, Landen, & Kashima, 1991; Forehand, Wells, & Griest, 1980; Shriver & Kramer, 1993), parents in our study were involved in jointly developing the intervention with the first author. Specifically, they actively participated in identifying the target skill to be taught, specifying the schedule and location for implementing the intervention, and providing input with regards to the task analysis, prompts, reinforcers, and consequences. For example, Vivian's mother improved the purchasing task sequence by adding a step that she felt would benefit her daughter. Subsequently, the step of repeating the purchase amount after the cashier indicated the total price was used with all three dyads. Further, although the skill of purchasing and the use of the constant time delay procedure remained consistent across all three dyads, the community sites selected were individualized to meet family needs. For example, Maggie and her mother shopped at grocery stores, Vivian and her mother made purchases in discount department stores, and Bonny and her mother shopped at a music store to purchase supplies for Bonny's saxophone. Additionally, parents were encouraged to schedule times and locations for conducting the intervention that matched times when they would typically shop in the community.

The parent training was effective in teaching parents the constant time delay procedure. Parents were able to acquire the procedure within three sessions and apply it in the community setting, with concurrent improvement in student performance. This is encouraging, given that parents in this study took less time than caregivers in the Wall and Gast (1997a) study, who needed 16 sessions to acquire the skill.

Before the training, all three students' level of participation in the purchasing routine (e.g., helping the parent bag

the groceries, pushing the cart, locating items) was low. In contrast, they consistently became involved in each step of the purchasing routine during and after parent training. During the probe phase, parents generally made an effort to include their daughters in the overall purchasing routine by way of general conversation, task description, or directives. For example, Maggie's mother would often instruct Maggie to walk faster or closer to the cart in order to prevent her from wandering off on her own in the store. However, parents often completed most of the purchasing task during the probe phase, which is consistent with findings of previous research (Allen & Hudd, 1987; Baker, Landen, & Kashima, 1991; Hilton & Henderson, 1993). This was especially true in Maggie's case. Her mother used large bills (e.g., $50) and handed them to the cashier without involving Maggie.

In addition, parents maintained use of the instructional procedure while students maintained their ability to complete the skill several weeks (i.e., 6–8 weeks) after the completion of the intervention. These findings regarding maintenance are consistent with those of previous parent training research (Alvey & Aeschleman, 1990; Cowart, Iwata, & Poynter, 1984; Sowers & Powers, 1995; Wall & Gast, 1997b). Parents' willingness to be involved in the education of their daughters and the positive evaluation of the instructional procedure by parents and their daughters in this study seemed to contribute to improved performance and task behavior, as in several previous investigations (Huynen et al., 1996; Sowers & Powers, 1995). Parent participants were satisfied with the intervention and reported that they felt they "learned something new." One participant commented that the procedure she learned in the training really "made sense" and was "very simple." Prior research conducted with parents yielded similar responses with regard to overall satisfaction with the ability to work with one's child (Forehand et al., 1980; Shriver & Kramer, 1993). Further, parent participants in the current study indicated strong satisfaction with being able to effectively teach their child a skill to mastery. One parent stated that as a result of the intervention, she realized that she did "too much for my daughter" and needed to allow her daughter to do things more independently. All three parents indicated that time was a major factor that inhibited independence. Maggie's mother stated, "It's quicker to do it myself most of the time." However, after the intervention she stated that "once she knows what to do and can help me, we actually spend less time than if I were shopping by myself." Vivian's mother reported that although she did most of the shopping herself before the intervention, her daughter is now assisting with much of the shopping.

Several limitations of the study require that the findings be interpreted cautiously. First, although this study employed a multiple-probe design, the third participant remained in the probe phase for an extended period of time. Given that observations included natural occurrences of the purchasing routine, child training instruction was time-consuming. For example, purchasing groceries occurred only once or twice a week. As such, opportunities for data collection were limited to a few sessions per week. This created a situation in which Dyads 2 and 3 remained in the probe condition for 11 and 16 weeks, respectively. Further, the long gap between the last two baseline probes may have masked variable data, or even a trend, right before intervention began.

A second limitation is that the first author developed the task analysis used in the probe condition. Although this was necessary to prevent dyads from changing their behavior as a result of being involved in the task analysis, it poses a limitation with regards to comparison of probe and intervention data. The task analysis during the probe condition differed slightly from the one used during intervention (the addition of one more step), which was jointly developed with parents. Third, when calculating the percentage of unprompted correct responses, only the first item on the shopping list selected by the participated was used. Therefore, the calculation of percentage did not take into account responses for the remaining items on the shopping list. However, it must be noted that the items purchased in each session differed.

Fourth, because the first author served as trainer, primary observer, and trainer of second observer, the potential for observer bias must be considered in interpreting the results. Fifth, another limitation is that this study did not systematically probe for generalization to novel skills or program for generalization. Generalization was only informally discussed during the parent training phase. Dyads were observed once before and during the child training phase as they completed the skill of ordering in restaurants or crossing the street with minimal generalization (an average of 67% and 32% increase, for parents and child participants, respectively). Future research should directly plan for generalization, to produce the necessary high levels of performance. Finally, only the mothers of the 3 participants chose to be involved in this study. It may be the case that in many families, mothers, rather than fathers, assume the traditional role of caregivers, thus explaining these mothers' willingness to participate. However, future research should examine whether these effects would be the same when implemented by other family members, such as siblings or fathers. In addition, because adolescents are often resistant to receiving instruction from their parents, future research should consider intervening in early years, when children are willing to learn from their parents.

## Implications for Practice

In summary, this study highlights the importance of parental involvement in the instruction of adolescents or young adults with disabilities. The parent-delivered intervention helped students with disabilities not only acquire purchasing skills but also maintain the taught skill and demonstrate generalization to novel or related skills. The constant time delay procedure in our study included fewer steps than the one reported in the literature (Wolery et al., 1992). Given that this procedure

helped both the parents and the students in our study, it may be the case that such modifications are necessary when involving parents. The ease of implementation of procedures must be considered if parents are likely to use them. An implication for future classroom practice is developing a parent-delivered intervention that can be readily incorporated in a variety of settings.

Future research should consider involving parents of children with disabilities in their children's education as early as possible, to help ensure that skills taught at school are generalized and maintained in the home and community. Giving parents tools that they could use to instruct their children is one way for professionals to bridge the gap between home and school. Another implication is that the effectiveness of the intervention when implemented by the parent may indicate the importance of researchers' and teachers' working with parents to adapt the instruction to meet individual student needs. This may entail determining family routines (e.g., banking, street crossing, laundry) and involving parents in developing a viable intervention package that meets their family needs. Involving parents in the implementation of this study was important, because parents are more likely to understand their children's potential for independent living and to continue to provide opportunities for their children to use the learned skills even after the completion of the study.

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